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(54) **LE PROJET KOALA**
(54) **THE KOALA PROJECT**



Industrie Canada Industry Canada

Project Name: Koala

Summary

This project tracks a low power radio transmitter (each with a unique code) within a defined space using receivers placed at modelled locations. A central server performs the tracking and logging, while results are displayed on one or more client computers. This client-server approach allows the greatest flexibility in using and displaying the results, as well as a scaleable solution that can operate in all sizes of environment.

Although this system superficially resembles a GPS system it is worth noting the differences. A GPS system would cost approximately \$1500 per unit and such a system is designed to only report to the unit where the unit is. The Koala system is significantly cheaper, reports to one or more remote stations the location of the unit, and has the ability to record where that unit has been.

A system of this sort would have a wide variety of applications including:

1. Shopping malls
 - a. tracking children
 - b. tracking strollers / wheelchairs / carts
 - c. locating cars
2. Grocery stores for tracking shopping carts
3. Hospitals
 - a. tracking wheelchairs
 - b. tracking patients
 - c. tracking equipment
4. Schools / Day care centres
 - a. keeping children within the building
 - b. keeping equipment within the building
5. Amusement Parks
 - a. tracking children
 - b. tracking strollers / wheelchairs / carts
 - c. locating cars

Each of these possible use will be discussed in detail below, along with additional options that could be marketed to that particular buyer.

This list is not exhaustive it merely covers the markets we have considered in detail. Other possibilities include golf clubs, larger factories, and many others that have not even occurred to us,

Status

A patent application has been filed for this product. A timeline and costing has been completed for the software development. Design specs for the transmitter, parts list, and costs are currently being produced.

Suggested Marketing Name

The name should suggest the themes of tracking and locating as well as reliability. Tracker is already a Registered Canadian Trademark for computer software (1989). Hound Dog, Sentry, and Tracer are possibilities.

Detailed Description of Each marketing area

Shopping malls

For this application, the receivers are placed in the ceiling of a single floor mall or at various levels in the case of a multiple floor mall. Receivers would also be set in the light posts of the parking lot. These would be wired to one or more servers (depending on the scaling required) in the mall office or security office. Several transmitters are placed on bracelets with a circuit to indicate if the bracelet is cut or broken. Additional transmitters are placed inside rental strollers, wheelchairs, and carts.

Parents are encouraged to bring their children to the information booth where the child can be given a transmitter bracelet which they wear while they are in the mall. The parent's name and the child's bracelet number are recorded. If a child is lost, the parent comes to the information centre where the client software will show the location of the transmitter within the mall. The closest security person can be dispatched by walkie-talkie to retrieve the child.

The transmitter can send an alarm signal if the circuit around the bracelet is broken. This would cover the case of a child being abducted where the abductor understood the purpose of the bracelet. A further alarm could be triggered the instant the bracelet got to within a set distance of any door in the mall. This would cover the cases of intentional and unintentional theft of the bracelet, as well as an abductor who does not recognize the bracelet.

These alarms could be passive, such as an indicator at the information booth or security office allowing a security officer to be dispatched; or active such as a buzzer or siren and light at the door. With receivers in the lamp posts outside, the transmitter can be tracked not just within the mall but within the parking lot as well. With the security officer being directed to the problem by someone watching the client software, a much higher percentage of apprehension can be obtained. Additionally, mall security could be equipped with palmtop versions of the client software operated over a wireless network allowing them to direct themselves.

A similar alarm would sound for any strollers, carts or wheelchairs brought within a set range of the doors.

Since each transmitter is uniquely identified, the alarms could be set differently -- allowing carts into the parking lot but not off the property while strollers, wheelchairs and children are confined to the building itself.

In addition to the obvious "we are the mall that cares about your family" marketing strategy and the decreased theft of property and related decrease in insurance rates, such a system offers other benefits to the mall management.

As the location of the transmitter is known at all times, this information can be logged and the file later analysed for trends. This information when properly presented would show:

1. **Store Time.** For each transmitter it would be possible to know what stores were visited and what amount of time is spent in each store. If there are enough receivers used it would be possible to record which parts of a store were visited and for how long. Clearly the information itself is limited by the method it was obtained. By logging the path of a particular wristband, the management learns what the shopping patterns of parents with small children are. Data from the stroller transmitters provide demographic data for parents with very young children. Wheelchair data would show trends for mobility challenged people. Shopping carts provide a much broader base of information but currently it is only available on a "per store" basis and cannot be demographically linked to a particular target group. Some breakdown is possible using carts with baby seats to indicate new parents, and a transmitter that offers a different identification number if the "seat belt" in the cart is done up to show parents with younger children. The gaps in the data can be filled in using an active approach.. Station people at the mall doors requesting members of the target group wear a band while they are in the mall in exchange for a "thank-you gift" or mall gift certificate.
2. **Maintenance needs.** For each stroller, cart and wheelchair the data would show accumulated mileage since last maintenance. This would allow each unit to receive maintenance based on use rather than elapsed time resulting in a more balanced maintenance program and thus less unnecessary work being done. Units can be rotated between high traffic and low traffic areas to even the wear and tear across the entire fleet.

Additionally this system would allow mall management to offer an **in-house security** system to compete with the ones already in service at a very low cost. Stores that wish to participate are given a group of transmitters with more always being available from mall management. Unlike existing systems, no "detectors" would be required as the receivers are already installed in the mall. Such a security system is also better than any existing one on the market as not only does the store know that an item was taken, but that item can be tracked -- regardless of crowd size -- throughout the mall and parking lot. As with the mall doors, a threshold can be defined for the store front and

an alarm (passive or active) sounded if the item is removed from the store. Yet another advantage to this system is that it allows for the "sidewalk sale" concept that is already common in malls. The client software is simply re-configured to count the "sidewalk" displays as part of the store – setting off the alarm only if tagged items are removed from that store's assigned area. The system sold by Sensormatic involves the use of tags priced at \$1.25 each and a monthly rental fee of \$175 for a basic system.

Finally, each mall could provide a valet type service that would assist customers to remember where they parked. Transmitters could be picked up and placed on the dashboard. Client software could be installed at machines at each door allowing patrons to find their cars or the information booth could handle the requests. The only difficulty would be getting the transmitters back as patrons left the parking lot but management would have their plate numbers and would know which direction they left. A deposit could also be required to increase the number of tags returned. Transmitters not within the field of receivers at the end of the day could be removed from the system so that they do not work the next time the car returns. The system could also be configured to trigger an alarm if a car returns with an "expired" transmitter.

Tracking shopping carts within grocery stores

For this application the transmitters would be concealed within the shopping carts and the receivers would be within the store and light poles in the parking lot. This system would operate in the same general fashion as the system defined above for malls. The **maintenance** and **store time** additions would be available for use with the **store time** system capable of being expanded to show shopping paths, areas of aisles covered including any stop or pause time. For those stores that own the mall or plaza, the system could be expanded to offer the **in-house security** system covered above.

Ray Bechard, who is in charge of the cart shop for Zehrs Markets Ltd, stated that in south-west Ontario, Zehrs Markets owns 20000 to 22000 carts. Approximately 2000 per year are replaced both due to age and loss. Currently there are private contractors who recover off-property carts at a cost of \$1.50 per cart per recovery. Zehrs Markets pays approximately \$200 for each new cart. There are ten Zehrs stores within Kitchener-Waterloo: two in major malls, five in open plazas, and three in small malls, at least one of which is owned by Zehrs Markets. Mr. Bechard would be happy to discuss "an enhanced security system for carts and malls" at our leisure.

Hospitals

As with the systems above, this would involve receivers in the building and parking lot with the transmitters placed inside wheelchairs, and on bracelets. Special attention would need to be taken with the transmitter and the special needs of a hospital environment. This should not present a wall to the deployment of the system as there are many possible options if the basic idea produces a conflict with hospital needs. The transmitters could be equipped with an on/off switch, alarms could be set to prevent

transmitter equipped items from entering sensitive areas, the frequency and power of the transmitter can be set to avoid any problems.

Tim Hasenpflug, of the bio-med. Division of the Grand River Hospital in Kitchener - Waterloo, stated that new wheelchairs are \$500-\$600 and that at their two locations, Grand River Hospital has approximately 200 wheelchairs. Each chair receives maintenance once per year. One time consuming task for the maintenance is locating the required wheelchair. 1-2 chairs per year are lost. Several others go missing for extended time periods (up to multiple years) before being returned.

According to recent newspaper stories this is a lower than normal rate of loss of wheelchairs. Since each unit has a "used" value of approximately \$300 there are groups that use such thefts as a major source of income. The rate of loss in other urban centres should be explored.

The **maintenance** could be expected to pay off by only servicing the units as required by mileage. A feature for the client software to locate the closest wheelchair could be added as could an "in-use" feature to indicate that a particular chair is occupied. The flexibility of these features would act to balance the decreased theft of this type of mobile unit when considering the purchase of such a system.

The bracelets could be used to track the flow of patients through hospitals for efficiency using the **store time** option. In addition patients likely to wander off can be banded so that they can be found quickly and efficiently without resorting to the current and costly physical searches.

It would be worth exploring the special needs of this type of client to determine which additional mobile items should be tagged for transmitters. Other possibilities include crash carts, isolets, and mobile pharmaceutical cabinets. It would also be worth approaching service organizations and donors who provide many of the new features hospitals receive with an eye to making sales or securing funding for development.

Schools / Day Care Centres

This deployment would place transmitters on mobile school equipment (televisions, computers, VCRs) and in bracelets. The bracelets could be used to trigger an alarm when a chronic truant student attempts to leave without signing out. The tagged equipment would also trigger an alarm if it was removed from the building. In addition the tags would allow such equipment to be rapidly located within the school. This is a straight security deployment with no need for **maintenance** or **store time** additions.

Amusement Parks

Like the mall system this would involve both lost child applications using the bracelets and the **store time** option for marketing information. The bracelets themselves

could be used in various colours as the various grades of admission. An additional consideration for any amusement parks with water parks is that the transmitter bracelet must be waterproof. With the use of restricted access or pay parking for these sites the valet car location service is a more feasible add-on feature for this deployment as the restricted entry and exit points would leave a higher recovery rate for the transmitters.

Costs

Development

This system consists of two parts: the hardware modules and the server and client computers and software. At this time the hardware development costs and unit wholesale costs are not known

The client / server software would require a total of 6 months to complete. This completion date is subject to two benchmarks by the hardware development company one at the two month mark and one at the five month mark. Development cost would be on the close order of \$70000. This would include the production of the server software, windows client software package, configuration software, and analysis tools to produce reports based on the log files for the maintenance and store time options as well as the required manuals. Wildbear Consulting, Inc. has sufficient computer capability to produce an in-house prototype without additional hardware or software purchases. A detailed timeline with issues to be addressed is being developed but cannot be completed until the hardware developer has supplied appropriate figures.

Additional funds would be required to market this package. Wildbear Consulting, Inc. does not have the required expertise to market to this target audience. The hardware developer would need to handle marketing or both companies would need to jointly engage appropriate marketing personnel. Wildbear has already begun a search for an appropriate marketing partner.

Sales

Each installation would require one (or more) server computers. These computers would need to be Pentium 300 or faster with multi-Gigabyte hard drive (size determined by the logging requirements), 128 Megabytes of memory, Windows NT and a network card. In addition one or more client computers could be required. These computers would need to be Pentium computers with network cards running Windows NT/95/98. Cabling and surge suppressers for each machine would also be required. This produces a base cost of approximately \$6000 for hardware. This could be customer supplied or supplied by the re-seller.

Each installation would also require one copy of the server software for each server and one copy of the client software package for each client computer. The basic package (1 server and 1 client) would sell for \$2000 with additional client packages available at \$500 and additional server packages at \$1000.

There will be further costs for the transmitters, receivers, wiring, and installation. These figures will be solidified by the hardware developer.

Post sales support

Wildbear Consulting, Inc. and the hardware development company would be required to offer post sales support for their part of the project. Additional charges could be added to the sale price to cover a variety of support options. Details in this area remain to be worked out between the two companies.

Financing

Wildbear Consulting, Inc. expects to finance its portion of the development costs through internal resources and possible government research and development grants (focusing on the child safety aspects of the systems deployment in malls). The hardware development company would be expected to do the same. Return on that investment would come through percentages of sales. Wildbear is also willing to consider outside investors covering the development costs in exchange for their own percentage.

Possible Grants

Industrial Research Assistance Program (<http://www.cbasc.org/ontario/bis/1017.html>)

SR&ED and OITC tax credits should be applicable.

CRC - Antennas and Integrated Electronics (<http://www.cbasc.org/ontario/bis/2529.html>)

Eastern Seed Fund - Business Development Bank of Canada

Additional programs may be available through the Business Development Bank of Canada

Markets

A short survey of Kitchener - Waterloo (pop. 250,000) reveals that for the units described above there is a potential market of three hospitals, fourteen Malls or Plazas, four outdoor mall areas, 102 schools, 44 day care centres, and two amusement park for a total of 169 possible installations through 49 sales.

Detailed Operating Description

The hardware for this application uses a low power radio transmitter broadcasting a unique digital identification number at a specified interval (approx. 5 seconds). The transmitter also has a complete circuit check such that if the band it is mounted on is broken the transmitter broadcasts a different identification number (the alarm number).

Receivers are basic single frequency radio receivers hooked to a small circuit board. This board translates the signal strengths received by each receiver for each transmitter into digital signals and submits them to the local server software using a standard RS232 interface.

The software portion of this system runs on a base of an internet chat server. Automatic software uses the information from the receiver bundles to triangulate the location of each transmitter. Transmitters that can be precisely located in this way have their location broadcast on a specific chat channel ("complete") Transmitters that cannot be precisely located have their partial location broadcast on a different channel ("incomplete"). Automatic software uses the information from the "incomplete" channel plus its own "incomplete" information to finalize the location of each transmitter then broadcasts it on the "complete" channel. If the transmitter is broadcasting its alarm number the location is also placed on the "alarm" channel.

Client software monitors the "complete" channel and logs the location of each transmitter as it is broadcast on that channel. Using gateway software this information can be passed on by email or instant messaging to a location where it may be placed in storage or to an immediate use client (like a security guard looking for a particular child).

Additional Client software monitors the alarm channel and issues alarms to the closest security personnel. Enhancements such as including a picture of the victim, or their precise visual location can be added.

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